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Chelodesmid studies. XIV. On the systematic status of the genera Caraibodesmus and Platyurodesmus, and the proposal of the new tribe Caraibodesmini[1]

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The well-known biogeographic isolation of Jamaica is reflected in its diplopod fauna-by the striking poverty of chelodesmids, only two nominal genera of which occur on the island in contrast to the 15 genera recorded for Hispaniola. These taxa, *Caraibodesmus* and *Platyurodesmus*, contain about a dozen species readily distinguishable by peripheral characters although virtually nothing is known of their gonopod structure. As a result neither the affinities between the two genera nor between them and other chelodesmoids could be estimated. Although a number of species have been in my possession for many years, their study was deferred in the expectation of the material being worked up as part of a projected monograph on the millipeds of Jamaica. This intention being still forstalled by nomenclatorial problems in several major genera, no attention was given to *Caraibodesmus* until recent studies on the classification of the Chelodesmidae finally compelled examination of the Antillean components of the family.

Present information suggests that most of the insular forms show considerable affinities with the Andean fauna, less with that of Brasil or Guyana. There are, however, several structurally disjunct West Indian taxa which seem to have no close counterparts amongst the other known members of the family, among them *Caraibodesmus* and *Platyurodesmus* which are considered in the following pages.

HISTORICAL SUMMARY

The taxonomic history of *Caraibodesmus* can be traced quickly. The first recognized species named was *Polydesmus morantus* by Karsch in 1881; three new species and what was thought to be *morantus* were recorded by Pocock in 1894; and, lastly, having restudied Karsch's type material, Graf Attems (1899)

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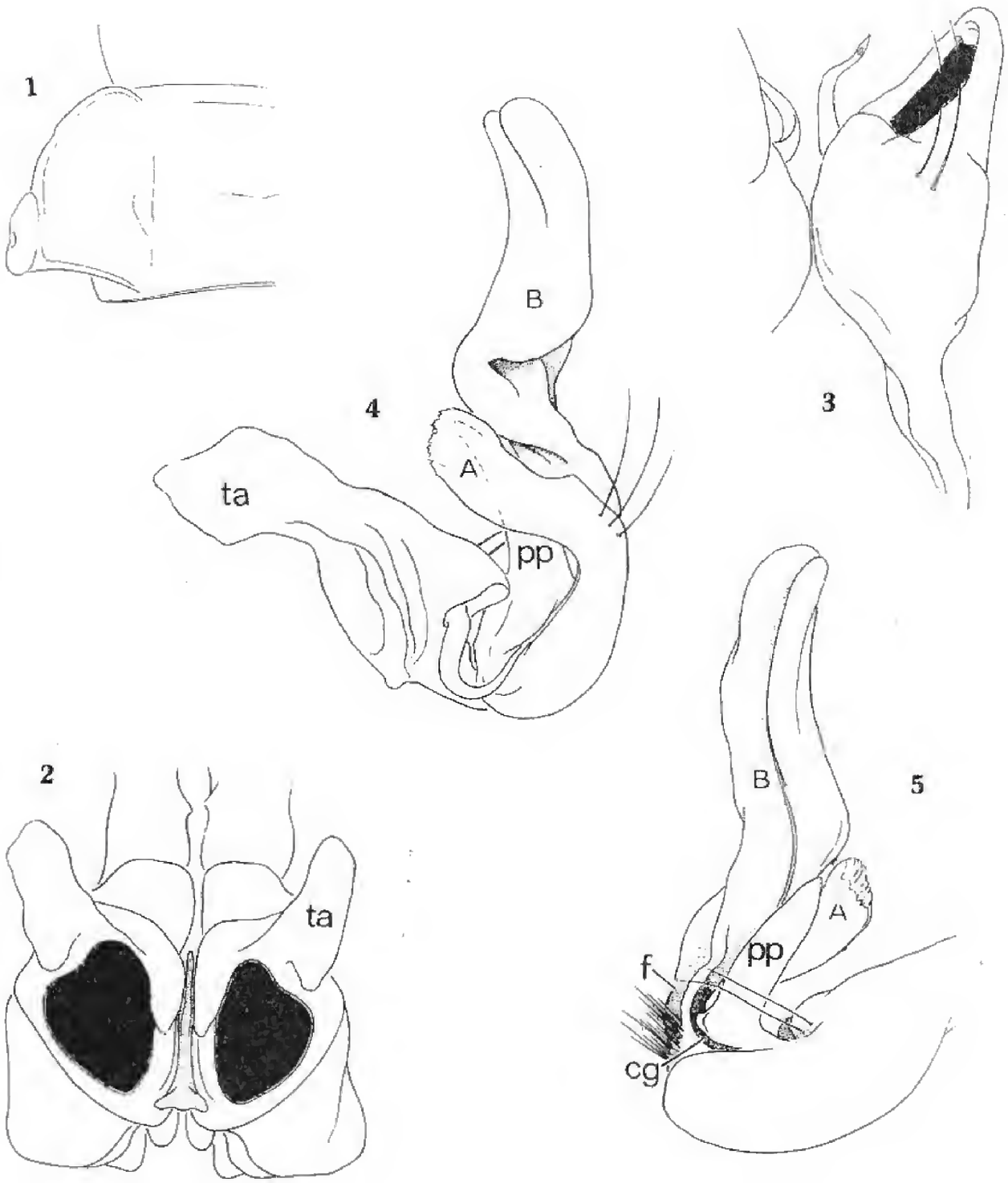
decided that Pocock had misidentified *morantus* and so proposed the new name *Odontopeltis tuberculatus* for Pocock's species. Thus, by the beginning of this century, five species were known, all of them placed by Attems in the genus *Odontopeltis*. Four had been illustrated by Pocock, whose drawings of the gonopods were small and somewhat schematic but at least indicated that the telopodite consisted of a long major branch and two shorter subequal processes from its base.

In 1918, the name *Caraibodesmus* was proposed by R. V. Chamberlin to encompass the above-mentioned species plus three which he newly described from Jamaica and Haiti and three others of highly problematic status. The genus was diagnosed principally on gonopod structure, verbalized in a short paragraph that provided vernacular names for the telopodite parts, but these names unfortunately gave not the slightest clues about anatomical relationships. The genus was not even mentioned in Attems' preliminary revision of the chelodesmids in 1931 and in his more definitive synopsis of 1938, it merited (along with 13 other Chamberlinian names) only relegation to the category of "Unsichere Gattungen." H. F. Loomis described *C. criniger* from Jamica in 1937, giving a long account of peripheral characters but essentially ignoring gonopod structure. His drawing of these appendages shows them in situ with minimum detail. In 1941, Loomis published a drawing (also made from the ventral aspect) of the genitalia of *C. bruesi* Chamberlin — the generic type species — which shows its distinctness from *criniger* but no anatomical detail. Nearly three decades later the same author (1969) described *C. pictus* from a Jamaican cave and gave two gonopod drawings; one of them, made from a lateral aspect, showed for the first time the course of the prostatic groove. Lastly, in 1975 again with inexplicit illustrations he named two additional species, bringing the number up to 12.

Platyurodesmus was set up in 1977 by Loomis for the single species *P. parallelus*, found in a Jamaican cave. Although referring the genus to the family "Eurydesmidae" (an incorrect name for Chelodesmidae), Loomis made no attempt to determine its possible affinity with *Caraibodesmus*, and the single gonopod drawing, although adequate for identification purposes, gives no intimation of overall structure.

TAXONOMY

By the courtesy of the authorities of the Science Museum, Institute of Jamaica (Kingston), I have been able to examine material of about ten species of *Caraibodesmus* (most of them undescribed); and through the kind offices of Dr. Howard V. Weems I studied the holotype of *Platyurodesmus parallelus*. It has thus been possible to determine the gonopod structure of these two genera and establish the degree of relationship between them. The attempt to ascertain affinities with South American groups has been less successful but at least ratifies the long-suspected systematic isolation of these Jamaican chelodesmoids. It seems desireable to formalize this status with the proposal of a tribal category:



Figures 1-5. *Caraibodesmus lewisi,* n. sp. 1, left paranotum of 10th body segment, dorsal aspect. 2, gonopods, internal (dorsal) aspect, to show form and location of sternum (stippled), concealed from view in most other aspects. 3, coxa of right gonopod, anterior view, with telopodite removed. 4, left gonopod, mesal view. 5, left gonopod, lateral view. All drawings from holotype. Fig. 1 drawn X 45, the others X 90. Abbreviations: A, presumptive acropodite element of gonopod; B, presumptive hypertrophied solenomerite; cg, cingulum at base of prefemoral process; f, femoral region of telopodite; PP, prefemoral process; TA, tracheal apodeme.

Caraibodesmini, trib. nov.

Components: *Caraibodesmus* Chamberlin, 1918; *Platyurodesmus* Loomis, 1977.

Diagnosis: Anterior legs of males unmodified; sternum of segment 4 with paramedian conical processes, that of segment 5 often with smaller processes between anterior pair of legs. Gonopod aperture small, oval, with flared and elevated rim, contained entirely in the metazonum. Gonosternum small, displaced inwardly between distal edges of coxae, ventrally slender and acuminate, dorsally abruptly broadened and truncated (Fig. 4). Tracheal apodemes unusually broadened, not sharply set off from coxal bases. Coxae somewhat flattened, without dorsal apophysis, two macrosetae on dorsal side. Telopodite set against coxa at about a right angle, prefemoral region more or less in line with major distal element of telopodite, with a small acuminate prefemoral process (PP) on the dorsolateral side, set off by a distinct basal cingulum (Fig. 5, cg). Femoral region strongly condensed, visible only in ventrolateral aspect just beyond setose prefemoral region (Fig. 5, f), giving rise to two processes: one (A) smaller and curved mesodorsad around base of the second and larger process (B), torsate about 180°, which carries the prostatic groove (see following paragraph for commentary on structural identity of these two processes).

Body variable in form but relatively slender; terga usually ornamented with transverse series of polygonal areas of tubercules, transverse metatergal sulcus present but poorly defined; paranota very variable in form, from large with deep lateral incisions to virtually absent or represented only by cylindric porosteles.

Distribution: Confined to the island of Jamaica.

Remarks: Caraibodesmines are unique amongst chelodesmoid taxa known to me in having three branches on the base of the gonopod telopodite. Owing to its position dorsad to the course of the prostatic groove, it is easy to identify the smallest, dorsolaterally-placed process, as corresponding to the prefemoral process common to most genera of the family. As shown in Fig. 5, this structure is unusual in being set off by a basal cingulum.

The identity of the other two branches is less obvious. There appear to be two possible explanations:

a) that the smaller, medially placed process (A) is the remnant of the normally elongated postfemoral region ("acropodite") and the larger and longer branch (B) carrying the prostatic groove represents a hypertrophied solenomerite, or

b) that the median basal process is an adventitious structure (a femoral or secondary prefemoral process) occurring only in the Caraibodesmini.

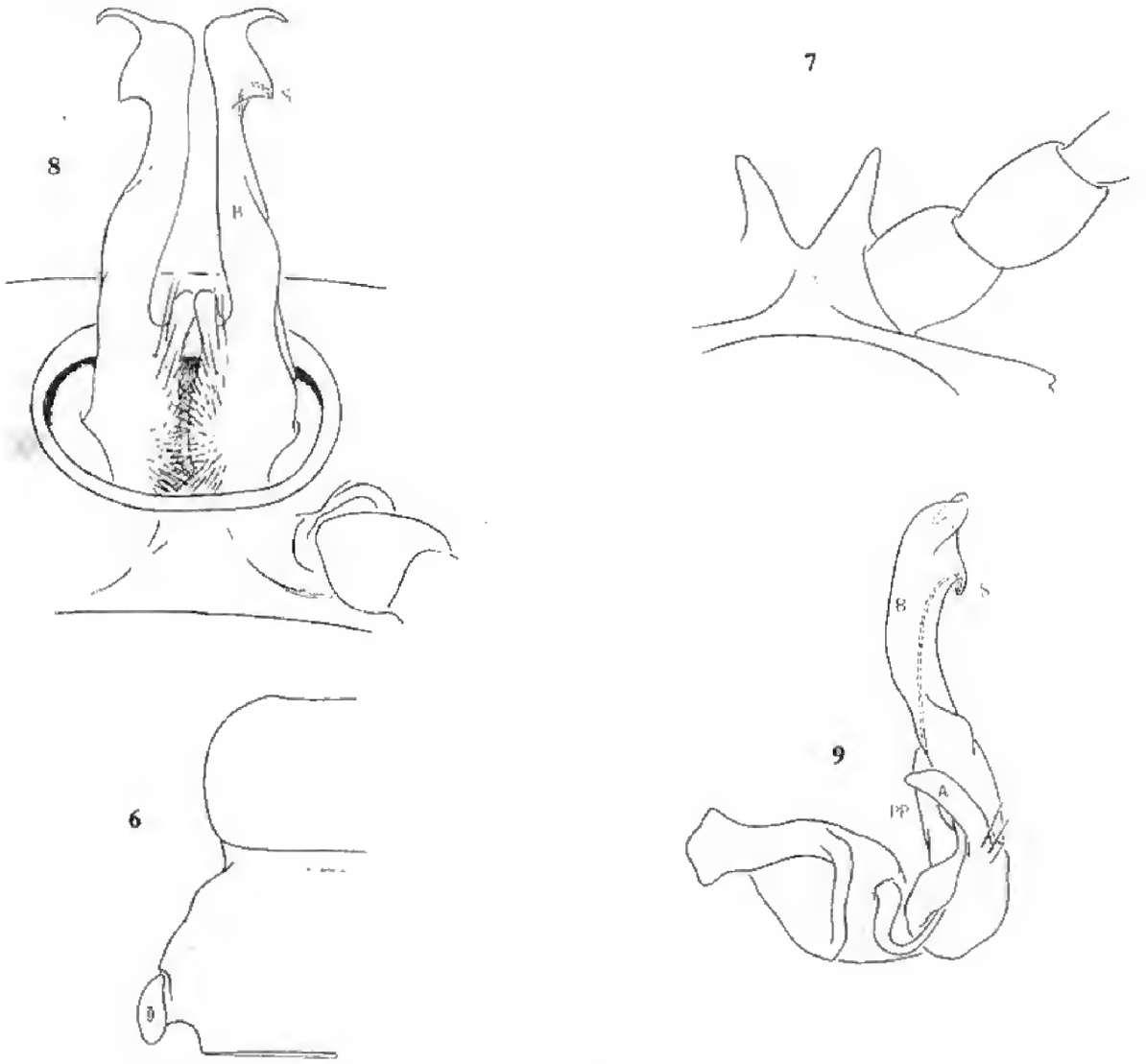
Of these two options, I admit to a personal bias in favor of the first. Although it would require strong modifications of the usual chelodesmoid plan of gonopod construction, it would not invoke the evolution of a singular new basal process. Moreover, the location on its mediobasal surface of three macrosetae suggests it to be an anatomical continuation of the prefemoral region. In other species of *Caraibodesmus* there is less disparity in size of the median and lateral processes.

The gonopod structure affords little in the way of evidence for relationship with other known tribes or generic groups. The general body form and presence of a

metatergal sulcus suggests the less modified genera of the Batodesmini, but this resemblence is contradicted by virtually all of the details cited in the diagnosis of that tribe (Hoffman, 1969: 265). If the two tribes mentioned had any common ancestry, it must be one of considerable antiquity, leaving no known intermediate forms and with the extant descendant lines amply specialized along divergent tracks.

Yet one looks forward to the eventual discovery of related forms that might shed some light on the origin of caraibodesmines. Perhaps some Mesamerican species related to *Caraibodesmus* will be found in Honduras, a country whose diplopod fauna is virtually unknown.

Although Loomis did not postulate any relationships for *Platyurodesmus*, examination of the holotype of *P. parallelus* shows the gonopods to be so similar to those of *Caraibodesmus* as to offer little of value in making a generic differentiation. There can be no doubt that *parallelus* represents only a specialized derivative of some species-group within *Caraibodesmus*.



Figures 6-9. *Platyurodesmus parallelus* Loomis. 6, left side of segment 10, dorsal aspect. 7, sternal processes of segment 4, posterior aspect. 8, gonopods in situ, ventral aspect. 9, left gonopod, mesal view. All drawings from holotype, drawn X 90. Abbreviations: A, presumptive acropodite; B, presumptive solenomerite; PP, prefemoral process; S, apical lobe carrying prostatic groove.

Key to the genera of Caraibodesmini

Sternum of segment 4 with two long, conical, divergent, paramedian processes (Fig. 7), sternum of segment 5 with two smaller conical processes between anterior pair of legs; paranota strongly reduced, only the peritremata retained as elongate ozophores; segment 19 almost as large as 18; terga smooth and polished ..... *Platyurodesmus*

Sternum of segment 4 with two short paramedian lobes, sternum of segment 5 without processes; paranota present, if small then with normal configuration; segment 19 much smaller and narrower than 18, ozopores opening flush on surface or nearly so ..... *Caraibodesmus*

Caraibodesmus.

Caraibodesmus Chamberlin, 1918: 232. Proposed for eleven species, three of them new. Type species: *Caraibodesmus bruesi* Chamberlin, by original designation.

Aside from the characters stated in the foregoing couplet, the two nominal genera of this tribe differ in that *Platyurodesmus parallelus* is apparently depigmented, while all of the known forms of *Caraibodesmus* are epigaean and endowed with prominent color patterns. There is, moreover, a remarkable variety of form as regards the paranota, which range from virtually absent to broad, elevated projections with prominent lateral incisions and dentations. In some forms the posterior margin of the metaterga is provided with a transverse row of stout acute spines, in others that region is smooth and polished. Nonetheless, the basic pattern of the gonopods remains remarkably uniform; among the dozen or so species known to me from males I see no anatomical discontinuity that corresponds in any way with tergal modifications, nor is of sufficient magnitude to warrant division of the genus. This situation strikingly parallels that of the Haitian "genera" *Quisquicia*, *Pogonodesmus*, and *Aplopodesmus*, distinguished by Loomis in 1936 for species having similar gonopods but different peripheral configuration. Attems combined these three names in 1938, and I think rightly so.

In 1975 Loomis published a key to twelve species of *Caraibodesmus* based on non-sexual characters. Material in my possession includes several additional undescribed forms, one of which is named below to give an identity to the species selected to illustrate gonopod structure in this genus. A detailed revision is still intended, following the eventual examination of types of the named forms.

Caraibodesmus lewisi, n. sp. — Figures 1-5.

Material: Male holotype, male and female paratypes (Coll. Hoffman) from Corn Puss Gap, ca. 5 km NW of Bath, St. Thomas Parish, + 650 m., JAMAICA, 23 November 1951 (R. L. Hoffman); two male paratypes (Sci. Mus. Inst. Jamaica) from Barnett's Gap, + 500 m., St. Thomas Parish, 14 November 1946 (G. B. Thompson).

Diagnosis: A large member of the genus (males to 30 mm long) in which the

body color is generally whitish except for the dark brown metaterga (unique in the genus); dorsum nearly smooth, without distinct dorsolateral spines on posterior edge of metaterga; prostatic groove terminates behind an elongate subterminal lateral flange.

Holotype: Adult male, length ca. 30 mm., body parallel-sided over most of length, widths of alternate segments (across paranotal maxima) as follows:

segment 1 - 3.0 mm	segment 10 - 3.7 mm
2 - 3.4	12 - 3.7
4 - 3.4	14 - 3.6
6 - 3.5	16 - 3.4
8 - 3.6	18 - 2.3

Color in life almost completely white, only the dorsal surface of the metazona uniform brown; peritremata white.

Head of normal appearance, epicranial groove moderately deep, genae convex, not margined laterally. Antennae widely separated, interantennae space 0.8 mm., subequal to length of 2nd antennomere. Epicranial setae 2-2, the outer seta of each pair set caudolaterad to inner, 1-1 interantennal, about four irregular transverse series of frontals, extending laterad nearly to end of genal convexity, about 7-7 clypeals, about 10-10 labrals, both the latter series merging indistinctly into a marginal genal series. Antennae long (5.2 mm.) and slender, extending caudally to base of 4th paranota; articles 2-5 similar in size and shape, 6th slightly longer and more clavate distally than preceeding; all articles except 1st densely and uniformly invested with pale recumbent setae. 7th article small, truncate-conical, sensory cones in two diads as usual; no evident sensory structures or areas on 6th or 7th articles.

Collum almost semicircular in outline, but acute lateral ends turned slightly outward and caudal edge thus trisinuate, surface convex, smooth and polished. Terga of segments 2-4 similar, paranota nearly horizontal, transverse, subquadrate, scapulorae with prominent acute anterior tooth and another at about midlength; posterior corner acute, directed slightly outward, width across caudal margin greater than across anterior. Segments 5-17 larger than anteriormost, metaterga with poorly-defined short transverse sulcus, posterior to which are four paramedian polygonal areas; paranota becoming gradually smaller and more produced caudally, anterior and lateral teeth lost by segment 7; peritremata sharply set off from paranotal edge and ovoid back to segment 16, those of segments 17-19 more or less continuous with lateral edge; ozopores placed laterally; paranota of segment 19 very small. Polygonal areas of posterior segments increase to eight, largest laterally. Stricture distinct across dorsum, shallow but with sharply-defined (not overhanging) anterior edge. Dorsum of segments 18-20 smooth. Epiproct of normal appearance, truncate, slightly concave, the four apical setae directed ventrad. Paraprocts of normal form, slightly coriaceous, the dorsal setae placed at uppermost end of mesal marginal rim. Hypoproct slightly produced medially, paramedian setae removed from edge, not set on tubercules.

Podosterna poorly defined, highest anteriorly, depressed medially and caudally where merging into a flat median area; surface smooth, with a few dispersed setae; a small but distinct conical, caudally directed spine located posterior to each coxal condyle. Transverse sternal groove moderately distinct. Maximum sternal width at midbody about 1.2 mm. Legs long (about 4.8 mm.) and slender, podomeres in order of decreasing length $2 > 6 > 3 > 5 = 4 > 1$, femora and tarsi especially long; all podomeres except coxa moderately setose. Tarsal claw small, straight. Stigmata small, flattened, indistinct, similar in size and shape, located near front of dorsal coxal condyles. Sides of segments smooth except for traces of pleurosternal carinae back as far as segment 13.

Sternum of segment 4 with two contiguous, acute, conical paramedian processes between 3rd pair of legs. Sternum of segment 5 broad, indistinctly bicruciate, more setose than posterior sterna; sternum of segment 6 very slightly concave. Coxae of 2nd pair of legs with small, acute, ventral tubercule bearing the gonopore.

Gonopod aperture entirely in the metazonum, stricture scarcely displaced anterior to it; transversely oval in shape, edges prominently elevated above level of segment. Gonopods (Figs. 3, 5) large, telopodites extending over sternum of segment 6; postfemoral region elongate, spatulate, with elongate subterminal lobe or fold on lateral side, otherwise unmodified.

Remarks: The type specimens were taken beneath the loose bark of a fallen tree along the road a few hundred feet down the south side of Corn Puss Gap, in company with a female of an undescribed species of *Caraibodesmus*. The two paratypes from Barnett's Gap carry the notation "In fallen tree."

Etymology: This handsome and interesting species is named in honor of C. Bernand Lewis, distinguished director of the Institute of Jamaica, as a small recognition of his manifold contributions to knowledge of the Jamaican biota and, more personally, in remembrance of his generous hospitality and efforts to further my field studies during a memorable visit to the island in 1951.

Platyurodesmus.

Platyurodesmus Loomis, 1977: 22. Monobasic with a new species. Type species, *P. parallelus* Loomis, by original designation.

Loomis's description of the body form adequately depicts the characters of the type species. I provide here drawings to show the hypertrophied sternal processes between the 3rd pair of legs, the singular form of the peritremata, and two views of the gonopods.

The basic similarity of the latter to the common pattern in *Caraibodesmus* reflects a close relationship and perhaps justified the opinion that *parallelus* is a specialized derivative form with a few peripheral characters emphasized during adaptation to cave life.

Platyurodesmus parallelus Loomis.—Figs. 6-9.

Platyurodesmus parallelus Loomis, 1977: figs. 4-6. Male holotype and female paratypes (FSCA) from Jackson Bay Cave, Clarendon Parish, Jamaica, 11 August 1974 (S. B. Peck).

The gonopod structure of this species scarcely differs from that of most species of *Caraibodesmus* except, perhaps, in that the prostatic groove ends on a small retrorse subterminal lobe (Fig. 9, S) of the large median branch here considered to be the hypertrophied solenomerite. In the forms of *Caraibodesmus* examined for this character, the groove merely terminates between two laminate terminal lobes. This difference alone scarcely justifies generic distinction, since the form and location of the prefemoral process and rudimentary acropodite (A) correspond exactly to the condition in *Caraibodesmus*, but the completely different form of the 19th segment in *parallelus* attests to an evolutionary change of some importance.

As noted by Loomis, although the body appears depigmented, the legs and antennae are not elongated. The lack of such modification does not necessarily preclude troglobitic status, not being especially advantageous to a cavernicolous scavenger.

ACKNOWLEDGEMENTS

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